

Health Consultation

Larson AFB Titan 1 Missile Complex Batum, Grant County, Washington

July 19, 1999

Contact information revised February 27, 2004

**Prepared by
The Washington State Department of Health
Under a Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry**



FOREWORD

The Washington State Department of Health (DOH) has prepared this Health Consultation in cooperation with the Agency for Toxic Substances and Disease Registry (ATSDR). ATSDR is part of the U.S. Department of Health and Human Services and is the principal federal public health agency responsible for health issues related to hazardous waste. This Health Consultation was prepared in accordance with methodologies and guidelines developed by ATSDR.

The purpose of this Health Consultation is to identify and prevent harmful human health effects resulting from exposure to hazardous substances in the environment. The Health Consultation allows DOH to respond quickly to a request from concerned residents for health information on hazardous substances. It provides advice on specific public health issues. DOH evaluates sampling data collected from a hazardous waste site, determines whether exposures have occurred or could occur, reports any potential harmful effects, and recommends actions to protect public health.

For additional information or questions regarding DOH, ATSDR or the contents of this Health Consultation, please call the Health Advisor who prepared this document:

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List of Acronyms

| | |
|-------|---|
| ACM | Asbestos Containing Materials |
| AFB | Air Force Base |
| ATSDR | Agency for Toxic Substances and Disease Registry |
| DERP | Department of Defense Environmental Restoration Program |
| DOH | Washington State Department of Health |
| EMEG | Environmental Media Evaluation Guide (ATSDR) |
| EPA | Environmental Protection Agency |
| FUD | Formerly Used Defense Site |
| ICBM | Intercontinental Ballistic Missile |
| Kg | kilogram |
| MTCAM | Model Toxics Control Act |
| NOAEL | No Observed Adverse Effect Level |
| NTP | National Toxicology Program |
| PAH | Polycyclic Aromatic Hydrocarbons |
| PCB | Polychlorinated Biphenyls |
| PCE | Tetrachloroethene |
| ppb | parts per billion |
| ppm | parts per million |
| RfD | Reference Dose (EPA) |
| SVOC | Synthetic Volatile Organic Compounds |
| TCE | Trichloroethene |
| TPH | Total Petroleum Hydrocarbon |
| USAEC | United States Army Corps of Engineers |
| UST | Underground Storage Tank |
| VOC | Volatile Organic Compound |

BACKGROUND AND STATEMENT OF ISSUES

The Washington State Department of Health (DOH) has prepared this health consultation at the request of the Washington State Department of Ecology (Ecology) to evaluate potential health hazards posed to residents living at or near the former Larson Air Force Base (AFB) Titan 1 Missile Complex in Lincoln County, Washington. DOH prepares health consultations under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR).

The complex is listed by the Department of Defense Environmental Restoration Program (DERP) as a Formerly Used Defense Site (FUD). The complex is located three miles south of Batum, Washington and approximately 50 miles north by northeast of Moses Lake, Washington (Figure 1). The geographic area around the missile complex is remote wheat fields and prairie. The nearest farm is approximately one mile to the north.¹

The complex was built on 309 acres in 1962 and became operational in 1963. The complex consists of three Intercontinental Ballistic Missile (ICBM) silos, their associated fuel cell silo, air shafts, underground storage tanks (USTs), power complex, two antenna silos, and a missile control center. (Figure 2) In March of 1965, the site was closed and then surplused in 1966. Following salvage operations, the facility was sold to a private owner. In the 1970s, the owner contracted with the US Forest Service for storage of 35,000 gallons of a DDT/diesel fuel mixture. In 1979, the fuel mixture was removed; however, it was reported that up to 40 gallons was spilled. Vandals ignited the spillage in 1992. Approximately 10,000 gallons of water was used to extinguish the fire. It was possible that this water mixed with DDT/fuel may have spilled into the power complex and down the uncapped wells. Other concerns include the possible contamination of standing water in the missile and antenna silos.²

ENVIRONMENTAL CONTAMINATION

The Environmental Protection Agency (EPA) conducted a preliminary site investigation of the Titan complex in 1984. The intent was to sample water wells located beneath the powerhouse, however, due to obstructions around the well heads, standing water surrounding the well heads was sampled. The laboratory analysis detected elevated levels of heavy metals (cadmium, lead, and chromium), and synthetic volatile organic compounds (SVOCs), consisting mostly of polycyclic aromatic hydrocarbons (PAHs).¹

During a site visit by the United States Army Corps of Engineers (USACE) in December 1997, standing water was seen in the missile silos, fuel cell silos, and the antenna silos. The source of the water is believed to be groundwater intrusion and rainwater. In addition, a large amount of friable potential asbestos containing materials (ACM) was scattered on the floors, silos, and utility corridors throughout the facility.

On February 12, 1999, the USACE contracted an Environmental Site Investigation in order to determine surface and sub-surface environmental conditions at the facility. The investigation

focused on volatile organic compounds (VOCs), total petroleum hydrocarbons (TPH), PAHs, heavy metals, and polychlorinated biphenyls (PCBs) in areas most likely to be affected, such as wastewater outfalls, surface depressions, and underground storage tanks.¹ Maximum concentrations of contaminants of concern in groundwater, elevator shaft water, and soil are given below in Tables 1 and 2.

Table 1. Maximum levels of contaminants of concern detected in on-site well water and standing water in elevator shafts at the former Larson AFB Titan 1 Missile Complex.

| Contaminant | On-site Water Well (ppb) | Elevator Shaft Water (ppb) | Comparison Value (ppb) | Comparison Value Reference |
|-------------|--------------------------|----------------------------|------------------------|----------------------------|
| DDT | *ND | 4.8 | 5 | Child EMEG |
| Lead | 30.5 | 293 | 15 | NA |
| TPH- D | | 860 | 1,000 | MTCA Method A Cleanup |

*ND Non Detect

Table 2. Maximum levels of contaminants of concern detected in soil at the former Larson AFB Titan 1 Missile Complex.

| Contaminant | Soil from the UST separator ditch (ppm) | Soil from the dry sewage pond (ppm) | Soil from launcher areas (ppm) | Comparison Value (ppm) | Comparison Value Reference |
|-------------|---|-------------------------------------|--------------------------------|------------------------|----------------------------|
| Total TPH | 630 | 278 | 146 | 200 | MTCA Method A Cleanup |

DISCUSSION

Contaminants of concern were chosen based on a comparison of levels detected in soil and surface water with the corresponding ATSDR comparison value. If a chemical exceeds its comparison value in *one* media (i.e., air, soil, surface water, groundwater) then it will be considered a contaminant of concern in *all* media. Contaminants of concern do not necessarily represent a public health hazard, but signify the need for further evaluation.

Low levels of contaminants were found in on-site water wells, surface water in elevator shafts, and soil. The following discussion evaluates the potential for exposure to contaminants of concern and the likelihood that adverse health effects could result from such exposure.

Soil

The only contaminant of concern in soil was TPH. The maximum concentration of TPH was found beneath the UST separator ditch at 630 parts per million (ppm), which exceeded its comparison value of 200 ppm, based on Model Toxics Control Act (MTCAs) Method A Clean

up. There is no minimal risk level (MRL) or reference dose (RfD) for TPH. ATSDR's MRLs and EPA's RfDs are estimates of exposure to a chemical that is likely to be without an appreciable risk of deleterious health effects. The Washington State Department of Ecology has adopted a surrogate approach for assessing the potential health effects resulting from exposure to TPH. This means that the toxicity of a single chemical similar to those found in TPH analysis is used to evaluate the total dose of the TPH. Adapting this approach, DOH used the oral RfD for pyrene published by EPA in order to estimate the potential for non-cancer effects from exposure to heavy hydrocarbons in soil.

No non-cancer effects are expected to result from exposure of a child to TPH in soil at these levels. It was assumed that future use of this facility would be youth related. An older child could play in the area during the summer months and be exposed by accidentally ingesting surface soil and contact of soil with skin. The estimated dose calculated from this scenario is below the oral RfD for pyrene.

It is possible that some contaminants known as PAHs could be present in TPH. EPA has classified some PAHs as possible and probable human carcinogens. *The cancer risk associated with PAH at this facility cannot be estimated since soil samples were not analyzed for PAHs.*

Groundwater

Of the three contaminants of concern listed for groundwater and elevator shaft water, only the comparison value for lead was exceeded in drinking water. It is assumed for purposes of this health consultation that the domestic well will be used for drinking water. The lead concentration in the domestic well was 30.5 parts per billion (ppb). The EPA classifies lead as a Group B2, probable human carcinogen (inadequate human, sufficient animal studies). Lead has not been classified by the National Toxicology Program (NTP). Exposure to the maximum concentration of lead in drinking water, 30.5 ug/l, is not expected to result in any adverse health effects. Since children drink an average of 1 liter of water per day, they would consume 30.5 ug/d or 0.0305 mg/d, and since a child weighs an average of 16 kilograms (kg), the child would receive an exposure dose of 0.0019 mg/kg/day. There are no chronic NOAELs exceeding this concentration. *Therefore, exposure to contaminants found in on-site well water is not expected to result in any adverse health effects.*

Exposure Pathways and Children

The potential for exposure and subsequent adverse health effects are often increased for young children as opposed to older children or adults. For example, children are far more likely to engage in activities that involve getting dirty. Playing in dirt, combined with frequent hand-to-mouth activity, provides toddlers with an increased chance of exposure to soil contaminants by way of ingestion and skin contact. In addition to the potential for higher exposures of young children, the risk of adverse health effects is also increased. ATSDR and DOH recognize that children are susceptible to developmental toxicity that can

occur at levels much lower than those causing other types of toxicity.

As noted above, children could be exposed to polychlorinated biphenyls (PAHs) in soil or lead in drinking water at levels that pose a very low risk for cancer and non-cancer health effects. *This evaluation is expected to be protective of children as well as adults.*

CONCLUSIONS

No adverse health effects are expected to occur as a result of exposure to contaminants detected in soil or on-site well water. However, levels of TPH in soil near the UST separator ditch may be of concern if cancer causing polycyclic aromatic hydrocarbons (PAHs) are present in significant quantities. In addition, the extent of tetrachloroethene (PCE) and trichloroethene (TCE) contamination has not been determined. More sampling is necessary to determine the extent of PAHs, PCE, and TCE at this facility, which may be used in the future as a youth camp.

RECOMMENDATIONS

1. No recommendations are necessary with respect to on-site groundwater.
2. Additional surface soil sampling (0-3") should be taken in the areas around the UST separator ditch and any areas of future high usage (e.g., gardens, doorways, play areas). Soil analysis with elevated total petroleum hydrocarbon (TPH) should be analyzed for PAHs.
3. Provide future data to the DOH for evaluation.

REFERENCES

1. Draft Project Completion Report, Environmental Site Investigation Former Larson AFB Titan 1 Missile Complex, Batum, Washington, Hart Crowser, February 12, 1999.
2. Statement of Work, Site Investigation of the Former Fairchild Atlas Missile Site and Former Larson AFB Titan Missile Complex, June 1998.
3. Draft Management Plan Environmental Site Investigation former Larson AFB Titan 1 Missile Complex Batum, Washington, Hart Crowser, August 31, 1998.

DEFINITIONS

EXPOSURE: An event that occurs when there is contact at a boundary between a human being and the environment with a contaminant of a specific concentration for an interval of time; the units of exposure are concentration multiplied by time.

EXPOSURE ROUTES: Exposure routes are the means by which contaminants enter the human body through ingestion, inhalation, or dermal contact.

EMEG: ATSDR=s Environmental media Evaluation Guide. A concentration in air, soil, or water (or other environmental medium), which is derived from ATSDR=s MRL, and below which adverse non-cancer health effects are not expected to occur. Separate EMEGs can be derived to account for acute, intermediate, or chronic exposure durations.

MRL: Minimal Risk Level. MRL is an estimate of daily exposure of a human being to a chemical (in mg/kg/day) that is likely to be without an appreciable risk of deleterious non-carcinogenic effects over a specified duration of exposure. MRLs are based on human and animal studies and are reported for acute (<14 days), intermediate (15-364 days), and chronic (>365 days). MRLs are published in ATSDR Toxicological Profiles for specific chemicals.

NOAEL: No Observed Adverse Effect Level. NOAEL=s are the highest exposure levels at which no harmful effects are observed.

RfD: Reference Dose. An estimate (uncertainty spanning perhaps an order of magnitude) of daily exposure (mg/kg/day) to the general public (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime exposure (chronic RfD) or exposure during a limited time interval (sub-chronic RfD).